Y/SUB/04-030332/2

BWXT Y-12
A BWXT/Bechtel Enterprise

Y-12 NATIONAL SECURITY COMPLEX

Y-12 GROUNDWATER PROTECTION PROGRAM GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS PLAN FOR CALENDAR YEAR 2005

September 2004

Prepared by

ELVADO ENVIRONMENTAL LLC
Under Subcontract No. 4300030332

for the

Environmental Compliance Department
Environment, Safety, and Health Division
Y-12 National Security Complex
Oak Ridge, Tennessee 37831

Managed by

BWXT Y-12, L.L.C.
for the U.S. DEPARTMENT OF ENERGY
under contract No. DE-AC05-00OR22800

MANAGED BY
BWXT Y-12, L.L.C.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

UCN-13672 (10-00)

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring of the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Y/SUB/04-030332/2

Y-12 GROUNDWATER PROTECTION PROGRAM GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS PLAN FOR CALENDAR YEAR 2005

September 2004

Prepared by

ELVADO ENVIRONMENTAL LLC
Under Subcontract No. 4300030332

for the

Environmental Compliance Department
Environment, Safety, and Health Division
Y-12 National Security Complex
Oak Ridge, Tennessee 37831

Managed by

BWXT Y-12, L.L.C.
for the U.S. DEPARTMENT OF ENERGY
under contract No. DE-AC05-00OR22800

TABLE OF CONTENTS

List of Figures

List of Tables

List of Acronyms and Abbreviations

ACO	Analytical Chemistry Organization
Bear Creek Regime	Bear Creek Hydrogeologic Regime
BWXT	BWXT Y-12, L.L.C.
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CY	calendar year
DOE	U.S. Department of Energy
East Fork Regime	Upper East Fork Poplar Creek Hydrogeologic Regime
GWPP	Groundwater Protection Program
REDOX	oxidation-reduction potential
SPS	sampling priority score
Y-12	Y-12 National Security Complex

1.0 INTRODUCTION

This plan provides a description of the groundwater and surface water quality monitoring activities planned for calendar year (CY) 2005 at the U.S. Department of Energy (DOE) Y-12 National Security Complex (Y-12) that will be managed by the Y-12 Groundwater Protection Program (GWPP). Groundwater and surface water monitoring performed by the GWPP during CY 2005 will be in accordance with DOE Order 540.1 requirements and the following goals:

- to maintain surveillance of existing and potential groundwater contamination sources;
- to provide for the early detection of groundwater contamination and determine the quality of groundwater and surface water where contaminants are most likely to migrate beyond the Oak Ridge Reservation property line;
- to identify and characterize long-term trends in groundwater quality at Y-12; and
- to provide data to support decisions concerning the management and protection of groundwater resources.

Groundwater and surface water monitoring during CY 2005 will be performed primarily in three hydrogeologic regimes at Y-12: the Bear Creek Hydrogeologic Regime (Bear Creek Regime), the Upper East Fork Poplar Creek Hydrogeologic Regime (East Fork Regime), and the Chestnut Ridge Hydrogeologic Regime (Chestnut Ridge Regime). The Bear Creek and East Fork regimes are located in Bear Creek Valley, and the Chestnut Ridge Regime is located south of Y-12 (Figure A.1). Additional surface water monitoring will be performed north of Pine Ridge, along the boundary of the Oak Ridge Reservation (Figure A.1).

Modifications to the CY 2005 monitoring program may be necessary during implementation. Changes in programmatic requirements may alter the analytes specified for selected monitoring wells or may add or remove wells from the planned monitoring network. All modifications to the monitoring program will be approved by the Y-12 GWPP manager and documented as addenda to this sampling and analysis plan.

2.0 MONITORING LOCATIONS

The monitoring locations to be sampled by the Y-12 GWPP during CY 2005 (Table B.1) are in two basic groups: (1) a fixed group of 43 monitoring wells, five springs, and 11 surface water stations that are sampled semiannually every year to address specific requirements of DOE Order surveillance monitoring; and (2) a group of supplemental monitoring wells to augment DOE Order surveillance monitoring, selected in accordance with the Y-12 GWPP Monitoring Optimization Plan (BWXT Y-12, L.L.C. [BWXT] 2003a). The monitoring optimization plan describes the technical approach implemented by the Y-12 GWPP to focus available resources on the monitoring wells at Y-12 which provide the most useful water quality monitoring data. The relative priority for sampling the supplemental wells is expressed by the annual sampling priority score (SPS). The SPS has been determined for each well granted active status (BWXT 2003a) that is not scheduled for sampling during CY 2005 by other organizations that share data with the Y-12 GWPP. Points for each well are scored for: location (the Bear Creek Regime is the focus for CY 2005); sampling history (includes the total number of samples collected and the length of time since the most recent sample); principal contaminant concentrations; and contaminant concentration trends. The SPS is the sum of these points. By sorting in descending SPS order, the wells are ranked to prioritize for sample collection. The CY 2005 SPS ranking, showing the 41 supplemental wells selected for sample collection, are provided in Appendix C.

The Y-12 GWPP monitoring network for CY 2005 includes 100 monitoring locations (Table B.1): 67 located in the Bear Creek Regime (Figure A.2), five located in the Chestnut Ridge Regime (Figure A.3), 23 located in the East Fork Regime (Figure A.4), and five located north of Pine Ridge (Figure A.5). Groundwater samples will be collected from a total of 84 monitoring wells, including 61 wells in the Bear Creek Regime (Figure A.2) and 23 wells in the East Fork Regime (Figure A.4). Well GW-722, located in the East Fork Regime, contains a Westbay™ multiport sampling system and is scheduled for sample collection from 10 ports at different depths in the well (Figure A.5). Samples of groundwater discharging from five natural springs will be collected during CY 2005, including three springs (SS-1, SS-4, and SS-5) in the Bear Creek Regime (Figure A.2) and two springs (SCR2.1SP and SCR2.2SP) in the Chestnut Ridge Regime (Figure A.3). Surface water samples will be collected from a total of 11 sampling locations during CY 2005, including three locations in the Bear Creek Regime, three locations in the Chestnut Ridge Regime, and five locations north of Pine Ridge. In the Bear Creek Regime, samples will be collected from Bear Creek at two sampling stations located from about 0.5 to 4.5 kilometers upstream of the confluence of Bear Creek and East Fork Poplar Creek (BCK-00.63 and BCK-04.55), and from one sampling station along a northern tributary (NT-01) to Bear Creek (Figure A.2). The tributaries located in the Chestnut Ridge Regime have been numbered from west to east (SCR1 through SCR5), and surface water samples will be collected from three of the tributaries at stations (SCR1.5SW, SCR3.5SW, and S17 [located in SCR5]) located along the north side of Bethel Valley Road (Figure A.3). The surface water sampling locations north of Pine Ridge include three tributaries (NPR07.0SW, NPR12.0SW, and NPR23.0SW) near the Scarboro Community and two locations (GHK2.51ESW and GHK2.51WSW) near Country Club Estates (Figure A.6).

3.0 FIELD MEASUREMENTS AND ANALYTICAL PARAMETERS

Before collecting samples at each monitoring location, field personnel will record (on Field Data Sheets) the following field measurements (Table B.2):

- static water level in monitoring wells (excluding wells equipped with a Westbay™ multiport sampling system);
- pH;
- water temperature;
- conductivity;
- dissolved oxygen; and
- oxidation-reduction potential (REDOX)

Field measurements of REDOX will not be obtained for sampling ports of monitoring wells equipped with a Westbay™ multiport sampling system.

For this Sampling and Analysis Plan, specific analytes are grouped by analytical method or by type (e.g., trace metals) and referenced as parameter groups (Table B.1 and Table B.2). In addition to field measurements, all groundwater and surface water samples will be analyzed for the following suite of parameters (identified as the Standard Administrative Parameter Group):

- miscellaneous laboratory analytes (turbidity, total suspended solids and total dissolved solids);
- major anions;
- trace metals (includes major cations);
- a comprehensive suite of organic compounds; and
- gross alpha and gross beta activity.

In addition to the analytes included in the Standard Administrative Parameter Group, samples from selected locations will be analyzed for specific radionuclides. Some of these analyses will supplement gross alpha and/or gross beta activity results, especially in cases where the gross activity reporting limits are elevated from interferences caused a by high dissolved solid content of the groundwater sample (see Appendix D). Additionally, determining the weight percent of uranium-235 (Table B.1 and Table B.2) is required to meet waste acceptance criteria for purge water disposal.

4.0 SAMPLE PLANNING, COLLECTION, AND HANDLING

The monitoring wells, springs, and surface water stations included in the GWPP monitoring network for CY 2005 are assembled into sample groups (e.g., BC-1) for sample collection, sample tracking, and data management purposes. A total of 13 sample groups are scheduled for CY 2005: seven groups for the first and third quarters, and six groups for the second and fourth quarters (Table B.1). The sampling sequence is generally from least contaminated to most contaminated location within each sampling group. A Groundwater Monitoring Schedule will be prepared for each quarterly sampling event by GWPP personnel based on Table B.1 that includes additional information necessary for field personnel to collect the required samples (e.g., management of purged groundwater).

Samples will be collected semiannually from all monitoring locations during CY 2005. As summarized below, the number of samples to be collected during each CY quarter (including conventional method samples) will range from 53 to 60, for an annual total of 226 samples.

HYDROGEOLOGIC REGIME/AREA	NUMBER OF SAMPLES PER QUARTER OF CY 2005	
	1st and 3rd	2nd and 4th
Bear Creek Regime	45	26
Chestnut Ridge Regime	5	0
East Fork Regime	10	22
North of Pine Ridge	0	5
TOTAL:	**60**	**53**

Personnel from the Y-12 Analytical Chemistry Organization (ACO) will be responsible for collection, transportation, and chain-of-custody control of most groundwater and surface water samples. Personnel from the Environment, Safety, and Health Division will be responsible for collection, transportation and chain-of-custody control of the groundwater samples from Westbay well GW-722. Based on the analytical parameters for CY 2005 (Table B.1 and Table B.2), ACO personnel will prepare bottle lists that specify the sample container type, size, preservative, and the laboratory test identification needed for each sampling location (see Appendix D). Sample collection will be performed in accordance with the most recent version of operating procedures for obtaining groundwater samples (BWXT 2002a, BWXT 2002b, BWXT 2004a, and BWXT 2004b) and surface water samples (BWXT 2002c). All field and laboratory activities will be performed in accordance with applicable requirements of the Y-12 Integrated Safety Management System.

Groundwater samples will be collected for the low-flow minimal drawdown method (low-flow method) from all monitoring wells during CY 2005, unless otherwise specified (Table B.1). For the low-flow method, a bladder pump is permanently installed in each well that is scheduled for sample collection. If well construction prevents permanent installation (e.g., flush-mounted wells), then the pump and tubing will be installed at least 24 hours before sample collection and will be removed when sampling is completed. In accordance with the groundwater sampling procedure for the low-flow method (BWXT 2004a), groundwater is purged, and subsequently sampled, from the well at a flow rate (<300 milliliters per minute) which ensures minimal drawdown of the static water level, therefore isolating the stagnant water column above the intake of the pump. Groundwater samples are collected from a well after the water level is in steady-state drawdown (<0.1 ft over a 15-minute interval) and field parameters (pH, conductivity, water temperature, REDOX, and dissolved oxygen) have stabilized (minimal variation over four consecutive readings).

Samples from selected monitoring wells will be collected by the "conventional" sampling method using a gas piston Bennett ® pump. The conventional sampling method, which was used to collect all groundwater samples through September 1997, involves removing three well-volumes of groundwater from a well (or purging the well dry) at about 5,600 milliliters per minute (much higher than the purge rate for low-flow) before collecting samples. Although the analytical results for the majority of wells do not show a distinct response to the change in method from the conventional to low-flow sampling, the analytical results for some wells potentially exhibit a clear response (BWXT 2002d and BWXT 2003b). To further investigate this phenomenon, samples will be obtained using the conventional method the day after collecting samples using the low-flow method at four wells (GW-071, GW-072, GW-624, and GW-626) in the Bear Creek Regime (Table B.1).

Groundwater sampling and pressure profiling using a Westbay™ multiport sampling system at well GW-722 in the East Fork Regime will be performed in accordance with the operating procedures (BWXT 2002a and 2002b). The groundwater samples from each sampling port (Figure A.5) will be collected in 250-milliliter nonvented stainless steel Westbay™ sample collection bottles filled at the designated depth in the well. Once filled, the bottles will be raised to the surface and the groundwater will be transferred to laboratory sample containers. The sample collection bottles will be lowered, filled, and retrieved as many times as needed to completely fill the laboratory sample bottles. Groundwater in the first sample collection bottles retrieved from each sampling port will be used as a "formation rinse" to obtain field measurements and to condition the sample collection bottle for each zone.

Unfiltered samples will be collected from all of the monitoring locations during CY 2005. Because analytical results have shown that the conventional sampling method may provide samples that are more turbid than the low-flow sampling method, filtered samples will also be collected from the three wells specified for conventional sampling (Table B.1). These samples will be filtered in the field using a 0.45-micron filter and analyzed for dissolved trace metal concentrations.

In addition to the groundwater and surface water samples, field blanks and equipment rinsate samples will be collected at the frequencies and analyzed for the parameter groups specified on Table B.1. Field blank samples will be collected from at least 10% of the sample groups. Therefore, one field blank will be collected during each quarter of CY 2005: in the Bear Creek Regime during the first and third quarters and in the East Fork Regime during the second and fourth quarters. Equipment rinsate samples will be collected from Westbay well GW-722 and from selected wells scheduled for conventional sampling (Table B.1). The rinsate sample will be collected immediately after field-cleaning the sampling equipment used to collect samples from the last sampling port (GW-722-17) or the last well sampled in a sample group (GW-624 and GW-071).

Trip blank samples, field duplicate samples, and laboratory quality assurance samples will be prepared and analyzed as specified in the *Quality Assurance Plan for the Analytical Chemistry Organization* (BWXT 2003c) using applicable analytical procedures. Trip blank samples will be prepared for each cooler used to transport samples for volatile organic analyses. Duplicate samples will be collected from at least 10% of the sampling locations. A total of 26 field duplicate samples will be collected during CY 2005, including 14 in the Bear Creek Regime, two in the Chestnut Ridge Regime, eight in the East Fork Regime, and two from surface water stations located north of Pine Ridge (Table B.1).

All groundwater and surface water samples will be relinquished under chain-of-custody control to the appropriate Y-12 ACO laboratory that will perform the analyses. The Y-12 ACO laboratories will perform each analyses within established holding times and deliver results within established turnaround times (see Appendix D).

5.0 REFERENCES

BWXT Y-12, L.L.C. 2002a. *Groundwater Sampling of Westbay™ Monitoring System Instrumented Wells.* BWXT Y-12, L.L.C. Management Requirement prepared by the Environment, Safety, and Health Organization (Y50-71-018, Rev.1).

BWXT Y-12, L.L.C. 2002b. *Pressure Profiling of Wells Equipped with Westbay™ Monitoring System Instrumentation.* BWXT Y-12, L.L.C. Management Requirement prepared by the Environment, Safety, and Health Organization (Y50-71-019, Rev.1).

BWXT Y-12, L.L.C. 2002c. *Liquid Grab Sampling.* BWXT Y-12, L.L.C. Management Requirement prepared by the Environment, Safety, and Health Organization (Y50-71-005, Rev. 1.1).

BWXT Y-12, L.L.C. 2002d. *Calendar Year 2001 Groundwater Monitoring Data Evaluation Report for the U.S. Department of Energy Y-12 National Security Complex, Oak Ridge, Tennessee.* Prepared by AJA Technical Services, Inc. (Y/SUB/02-012529/2).

BWXT Y-12, L.L.C. 2003a. *Y-12 Groundwater Protection Program Monitoring Optimization Plan for Groundwater Monitoring Wells at the U.S. Department of Energy Y-12 National Security Complex, Oak Ridge, Tennessee.* Prepared by Elvado Environmental LLC (Y/SUB/03-021559/2).

BWXT Y-12, L.L.C. 2003b. *Calendar Year 2002 Groundwater Monitoring Data Evaluation Report for the U.S. Department of Energy Y-12 National Security Complex, Oak Ridge, Tennessee.* Prepared by Elvado Environmental LLC (Y/SUB/03-021559/3).

BWXT Y-12, L.L.C. 2003c. *Quality Assurance Plan for the Analytical Chemistry Organization.* Prepared by the Analytical Chemistry Organization (Y/P65-9006, Rev. M).

BWXT Y-12, L.L.C. 2004a. *Groundwater Sampling.* Oak Ridge Y-12 National Security Complex Procedure prepared by the Environment, Safety, and Health Organization (Y50-71-016).

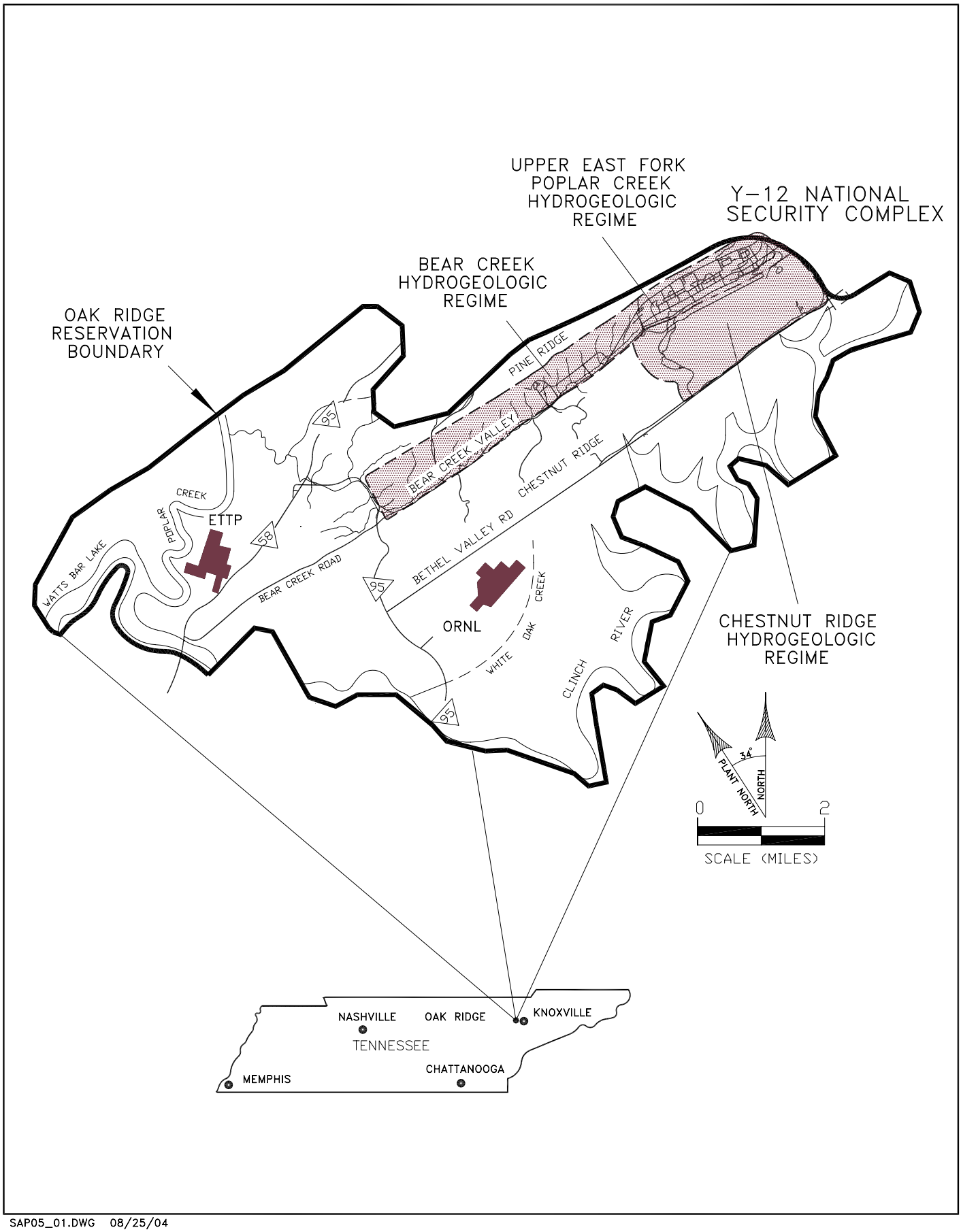
BWXT Y-12, L.L.C. 2004b. *Measurement of Static Water Level Elevation.* Oak Ridge Y-12 National Security Complex Procedure prepared by the Environment, Safety, and Health Organization (Y50-71-015).

U.S. Environmental Protection Agency. 1983. *Methods for Chemical Analysis of Water and Wastes*.

U.S. Environmental Protection Agency. 1996. *Test Methods for Evaluating Solid Waste Physical/Chemical Methods.*

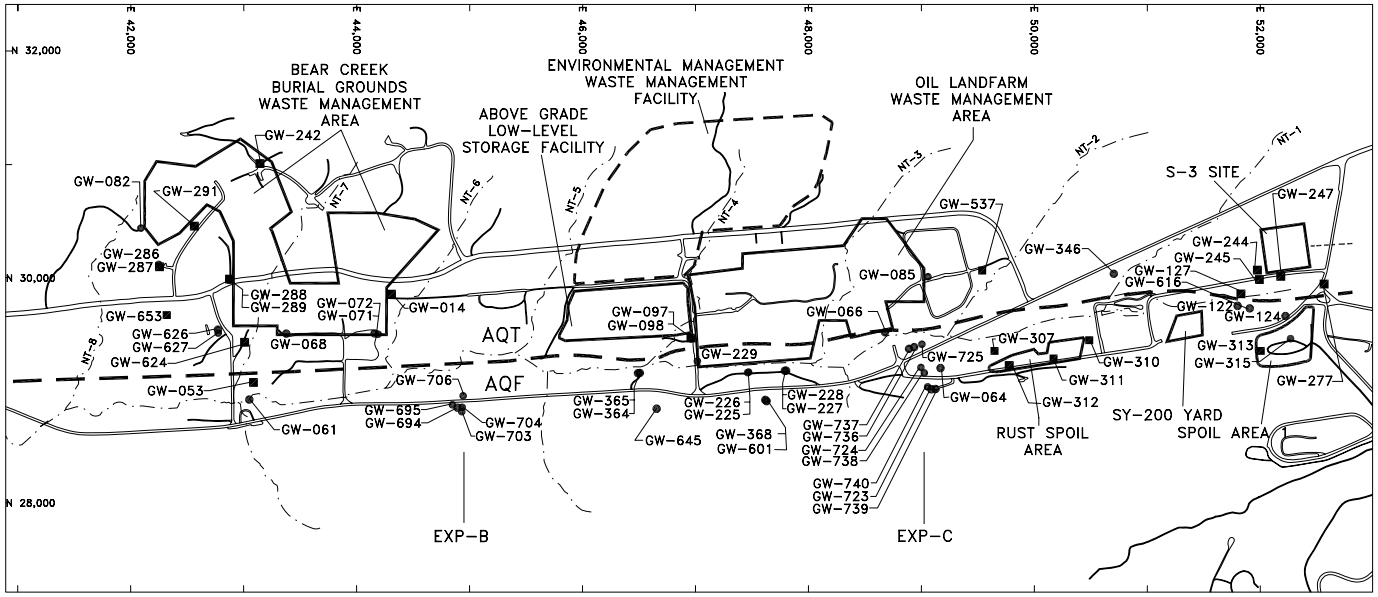
APPENDIX A

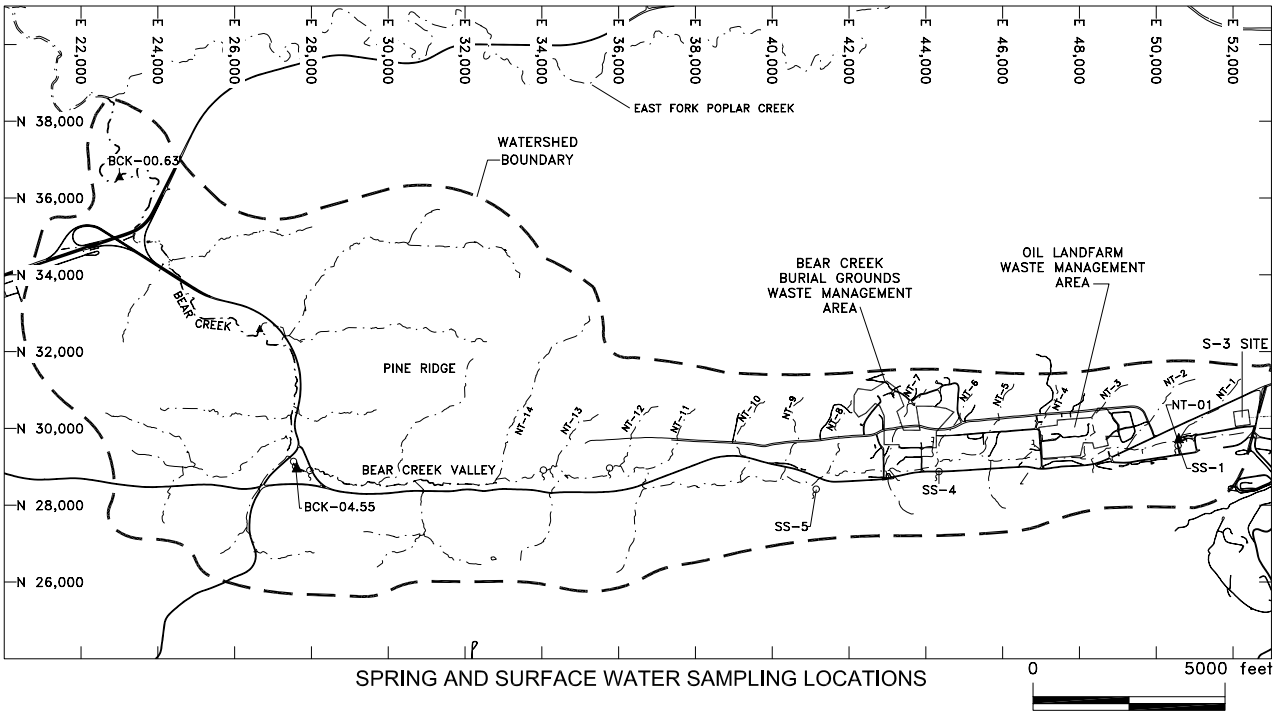
FIGURES



SAP05_01.DWG 08/25/04

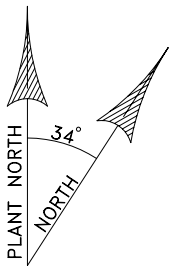
Fig. A.1. Hydrogeologic regimes at the Y-12 National Security Complex.





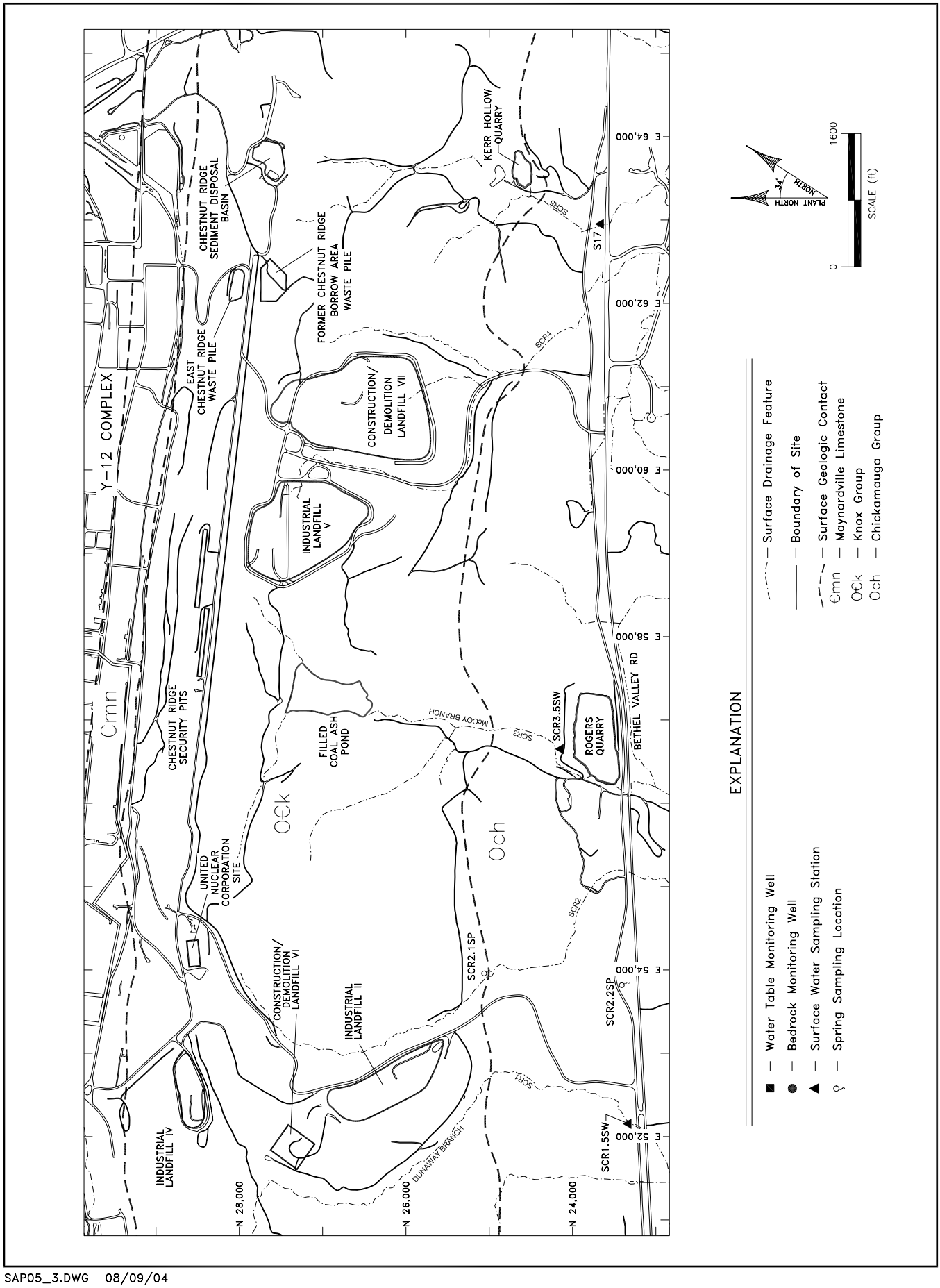
EXPLANATION

- ■ — Water Table Monitoring Well
- ● — Bedrock Monitoring Well
- ▲ — Surface Water Sampling Station
- ♀ — Spring Sampling Station
- EXP-C — Exit Pathway, Maynardville Limestone Picket
- — Surface Drainage Feature
- NT-5 — North Tributary
- AQT — Aquitard
- — Approximate Nolichucky Shale\Maynardville Limestone Contact
- AQF — Aquifer



SAP05_2.DWG 08/22/04

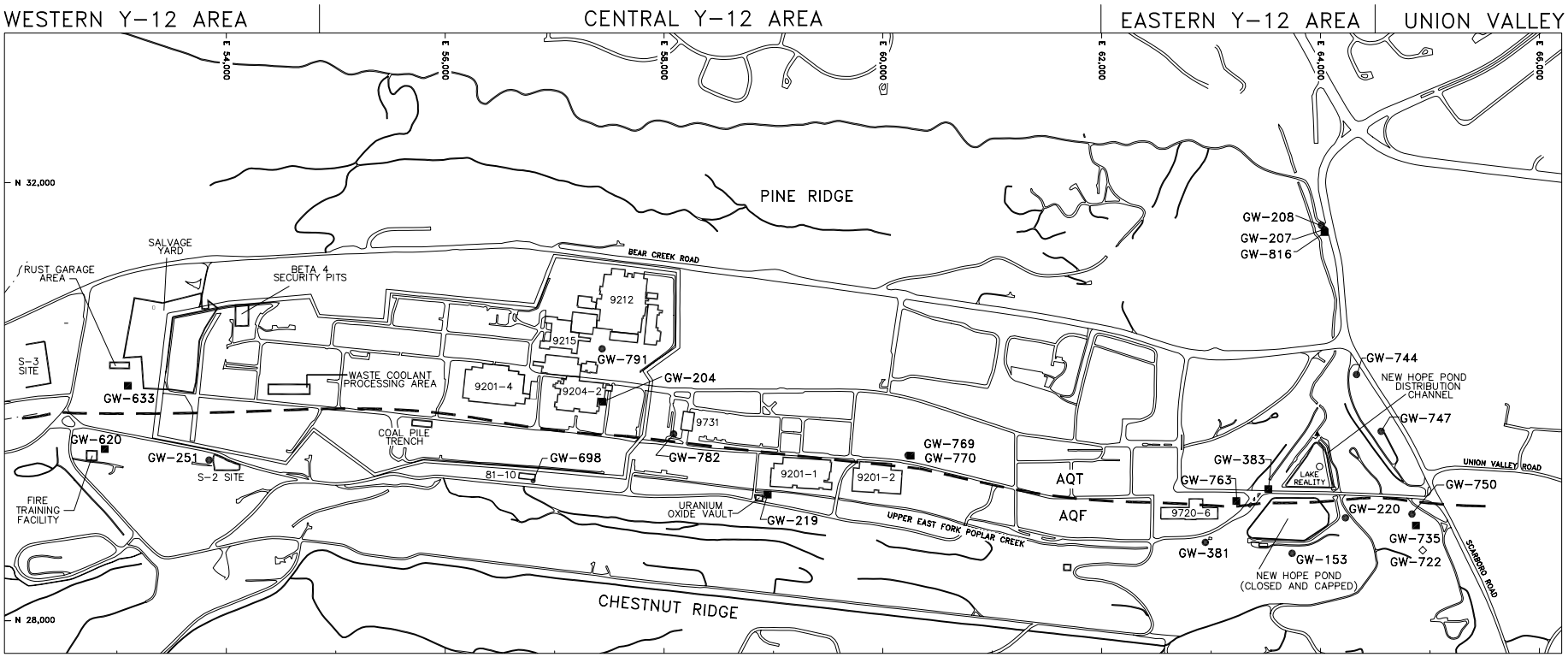
Fig. A.2. CY 2005 sampling locations in the Bear Creek Hydrogeologic Regime.



SAP05_3.DWG 08/09/04

Fig. A.3. CY 2005 sampling locations in the Chestnut Ridge Hydrogeologic Regime.

SAP05_4.DWG 08/25/04



EXPLANATION

- ■ — Water Table Monitoring Well
- ● — Bedrock Monitoring Well
- ◇ — Well With Westbay Multiport Sampling System
- ▲ — Surface Water Sampling Location
- AQT — Aquitard
- Approximate contact of Nolichucky Shale and Maynardville Limestone
- AQF — Aquifer

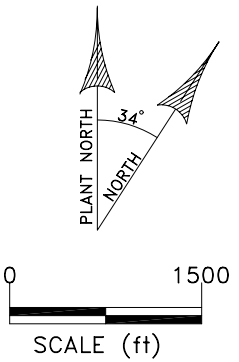
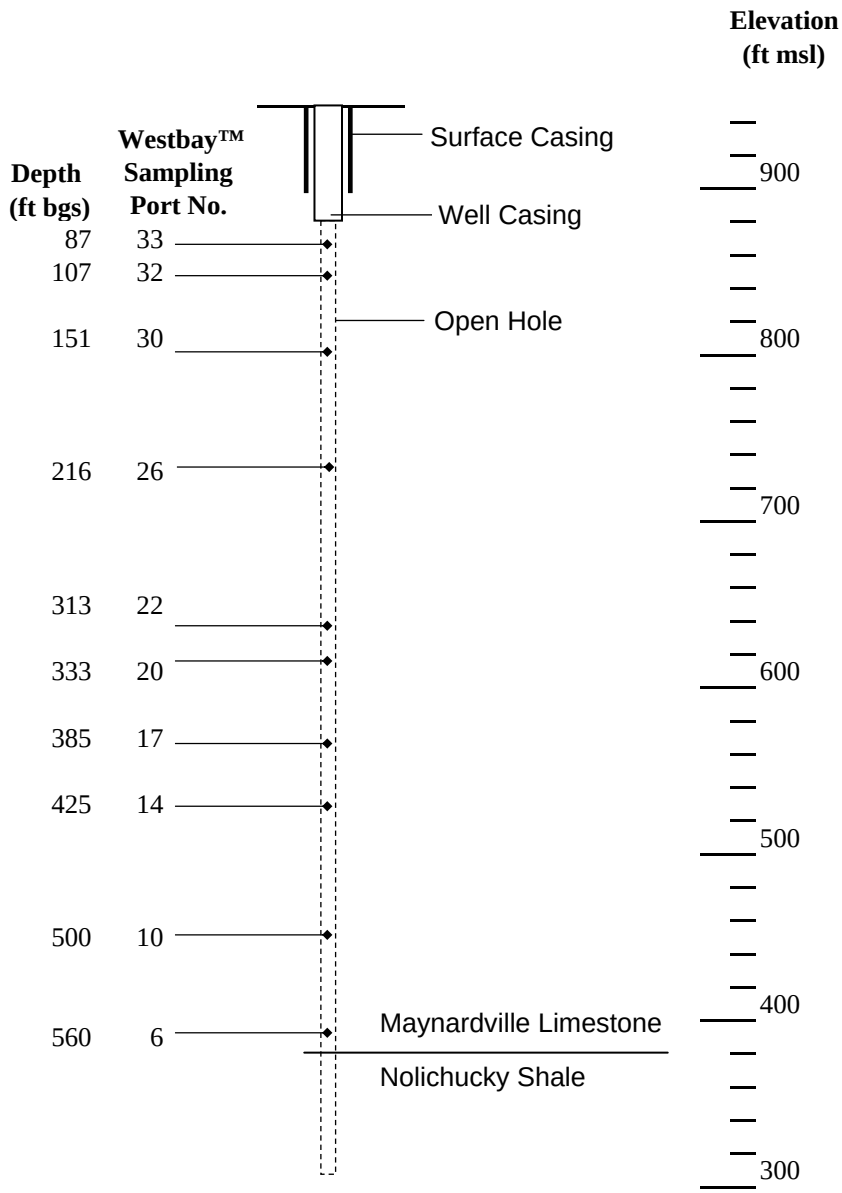
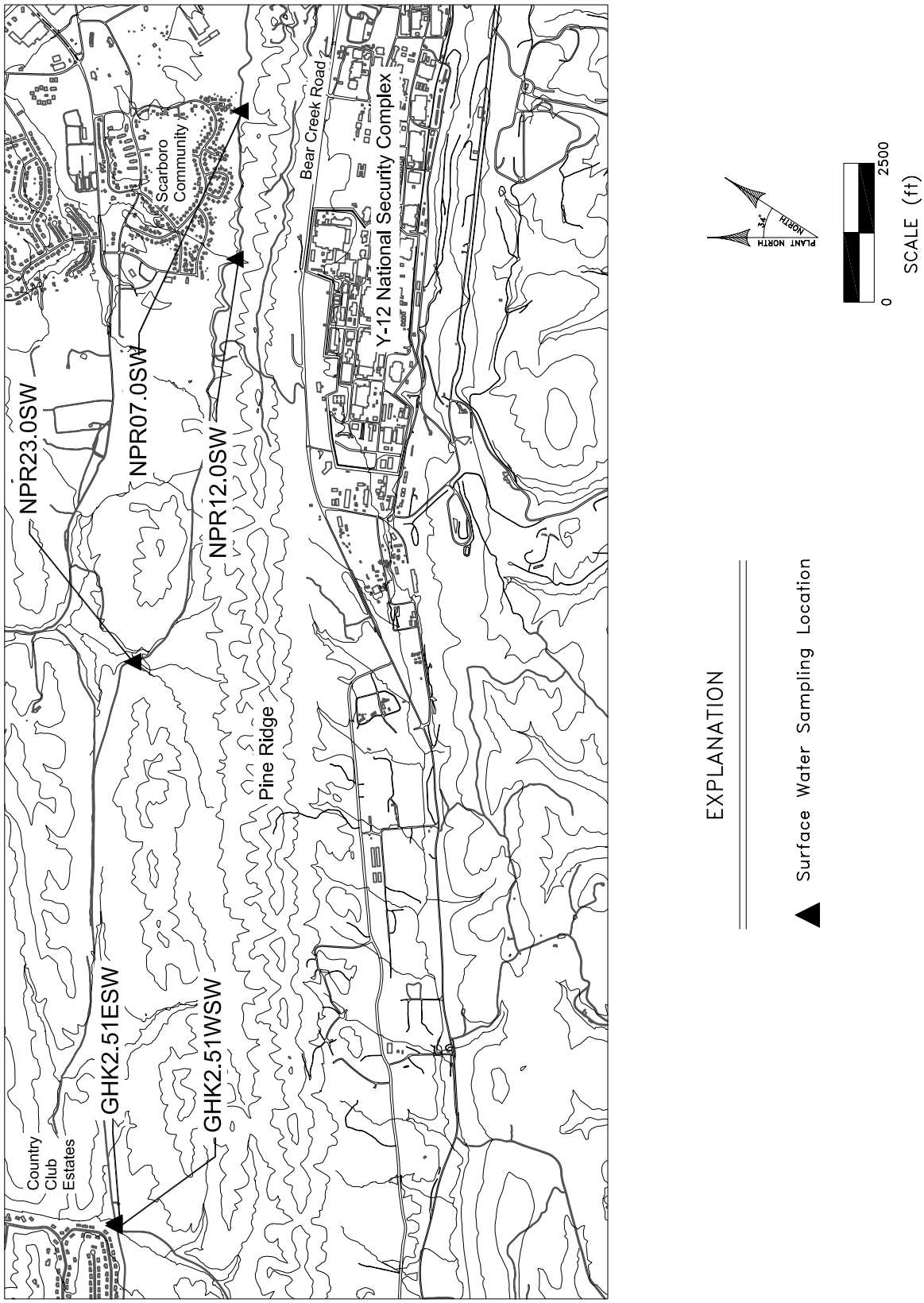


Fig. A.4. CY 2005 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime.



SAP05 Fig5.xls

Fig. A.5. Westbay™ monitoring system sampling port depths in well GW-722.



SAP05_6.DWG 08/25/04

Fig. A.6. CY 2005 surface water sampling locations north of Pine Ridge.

APPENDIX B

TABLES

Table B.1. Sampling sequence, frequency, and analytical parameters for groundwater and surface water monitoring during CY 2005

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Supplement [6]	Parameter Groups [7]
Bear Creek Hydrogeologic Regime						
BC-1 (Q1, Q3)	EXP-B	GW-694	Q1	SMP	Y	STD, RAD(13)
	EXP-B	GW-695		SMP		STD, RAD(13)
	EXP-B	GW-703		SMP		STD, RAD(13)
	EXP-B	GW-704		SMP		STD, RAD(13)
	EXP-B	GW-706		SMP		STD, RAD(13)
	EXP-C	GW-064		SMP	Y	STD, RAD(13)
	EXP-C	GW-723		SMP	Y	STD
	EXP-C	GW-736		SMP	Y	STD, RAD(3,12,13)
	EXP-C	GW-737		SMP	Y	STD, RAD(13)
	EXP-C	GW-739	Q3	SMP	Y	STD
	EXP-C	GW-740		SMP		STD
	EXP-C	GW-738		SMP		STD, RAD(13)
	EXP-C	GW-724		SMP		STD
	EXP-C	GW-725		SMP		STD, RAD(13)
BC-2 (Q1, Q3)	RS	GW-311		SMP		STD
	SPI	GW-313		SMP	Y	STD, RAD(12,13)
	SPI	GW-315		SMP		STD, RAD(13)
	RS	GW-307		SMP	Y	STD, RAD(12,13)
	RS	GW-312		SMP	Y	STD, RAD(13)
	RS	GW-310	Q1	SMP	Y	STD, RAD(13)
	S3	GW-124		SMP	Y	STD, RAD(12,13)
	S3	GW-616		SMP	Y	STD, RAD(3)
	S3	GW-122	Q3	SMP	Y	STD, RAD(12,13)
	S3	GW-277		SMP	Y	STD, RAD(3,12,13)
BC-3 (Q1, Q3)	EXP-SW	BCK-00.63	Q1	EXP		STD
	EXP-SW	BCK-04.55		EXP		STD
	EXP-SW	SS-5		EXP		STD
	EXP-SW	SS-4	Q3	EXP		STD
	EXP-SW	SS-1		EXP		STD
	EXP-SW	NT-01		EXP		STD

Table B.1 (continued)

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Supplement [6]	Parameter Groups [7]
BC-4 (Q1, Q3)	OLF	GW-097	Q1	SMP	Y	STD
	OLF	GW-098		SMP		STD, RAD(13)
	OLF	GW-645		SMP	Y	STD, RAD(13)
	OLF	GW-364		SMP	Y	STD, RAD(13)
	OLF	GW-365		SMP	Y	STD
	OLF	GW-066	Q3	SMP	Y	STD, RAD(13)
	OLF	GW-085		SMP		STD
	OLF	GW-537		SMP		STD, RAD(3,13)
BC-5 (Q1, Q3)	OLF	GW-227	Q1	SMP	Y	STD, RAD(3,12,13)
	OLF	GW-228		SMP	Y	STD, RAD(13)
	OLF	GW-368	Q3	SMP	Y	STD, RAD(13)
	OLF	GW-601		SMP	Y	STD, RAD(12)
	OLF	GW-226		SMP		STD, RAD(13)
	OLF	GW-225		SMP		STD, RAD(13)
	OLF	GW-229		SMP		STD, RAD(13)
	FIELD BLANK					VOC(1)
BC-6 (Q2, Q4)	BG	GW-286	Q2	SMP	Y	STD
	BG	GW-287		SMP	Y	STD
	BG	GW-653		SMP		STD
	BG	GW-242		SMP	Y	STD, RAD(3)
	BG	GW-288		SMP	Y	STD
	BG	GW-289		SMP	Y	STD
	BG	GW-291	Q4	SMP	Y	STD
	BG	GW-627		SMP		STD
	BG	GW-626		SMP	Y	STD
	BG	GW-626 (C)		SMP	Y	STD/F
	BG	GW-082		SMP		STD
	BG	GW-624			Y	STD, RAD(13)
	BG	GW-624 (C)			Y	STD/F, (RAD13)
	RINSATE SAMPLE (GW-624)					STD

Table B.1 (continued)

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Supplement [6]	Parameter Groups [7]
BC-7 (Q2, Q4)	BG	GW-053		SMP	Y	STD, RAD(13)
	BG	GW-061		SMP	Y	STD, RAD(3,12,13)
	BG	GW-072		SMP	Y	STD
	BG	GW-072 (C)		SMP	Y	STD/F
	BG	GW-068		SMP	Y	STD, RAD(13)
	BG	GW-014		SMP	Y	STD, RAD(13)
	BG	GW-071		SMP	Y	STD
	BG	GW-071 (C)		SMP	Y	STD/F
	S3	GW-346		SMP	Y	STD, RAD(3,12,13)
	S3	GW-127		SMP	Y	STD, RAD(3,12,13)
	S3	GW-244		SMP	Y	STD, RAD(3,12,13)
	S3	GW-247		SMP	Y	STD, RAD(3,12,13)
	S3	GW-245		SMP	Y	STD, RAD(3,12,13)
	RINSATE SAMPLE (GW-071)					STD
Chestnut Ridge Hydrogeologic Regime						
CR-1 (Q1,Q3)	EXP-SW	SCR1.5SW	Q3	EXP		STD
	EXP-SW	SCR2.1SP		EXP		STD
	EXP-SW	SCR2.2SP		EXP		STD
	EXP-SW	SCR3.5SW	Q1	EXP		STD
	EXP-SW	S17		EXP		STD
Upper East Fork Poplar Creek Hydrogeologic Regime						
EF-1 (Q2,Q4)	FTF	GW-620	Q2	SMP		STD
	S2	GW-251		SMP		STD, RAD(13)
	T0134	GW-204		SMP		STD, RAD(13)
	GRID E3	GW-782		SMP		STD
	RG	GW-633		SMP		STD, RAD(3,12,13)
	GRID D2	GW-791	Q4	SMP		STD
	FIELD BLANK					VOC(1)

Table B.1 (continued)

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Supplement [6]	Parameter Groups [7]
EF-2 (Q2,Q4)	GRID G3	GW-770		SMP		STD
	GRID G3	GW-769		SMP		STD
	NHP	GW-153		SMP		STD, RAD(13)
	UOV	GW-219	Q2	SMP		STD, RAD(13)
	GRID JP	GW-763		SMP		STD
	B8110	GW-698		SMP		STD
	NHP	GW-381	Q4	SMP		STD
	NHP	GW-383		SMP		STD
EF-3 (Q2,Q4)	EXP-SR	GW-208		EXP		STD
	EXP-SR	GW-207		EXP		STD
	EXP-SR	GW-816		EXP		STD
	GRID K1	GW-744	Q2	EXP		STD
	GRID K2	GW-747		EXP		STD
	EXP-J	GW-750		EXP		STD
	EXP-J	GW-735		EXP		STD
	NHP	GW-220	Q4	EXP		STD
EF-WB (Q1,Q3)	EXP-J	GW-722-06		EXP		STD
	EXP-J	GW-722-30		EXP		STD
	EXP-J	GW-722-26		EXP		STD
	EXP-J	GW-722-32	Q1	EXP		STD
	EXP-J	GW-722-33		EXP		STD
	EXP-J	GW-722-10		EXP		STD
	EXP-J	GW-722-22		EXP		STD
	EXP-J	GW-722-20		EXP		STD
	EXP-J	GW-722-14		EXP		STD
	EXP-J	GW-722-17	Q3	EXP		STD
	RINSATE SAMPLE					STD

Table B.1 (continued)

Sample Group [1]	Location [2]	Sampling Point [3]	Duplicate [4]	Monitoring Driver [5]	Supplement [6]	Parameter Groups [7]
North of Pine Ridge						
PR-1 (Q2,Q4)	EXP-NPR	NPR07.0SW	Q2	EXP		STD
	EXP-NPR	NPR12.0SW		EXP		STD
	EXP-NPR	NPR23.0SW		EXP		STD
	EXP-NPR	GHK2.51ESW	Q4	EXP		STD
	EXP-NPR	GHK2.51WSW		EXP		STD

Notes:

1 Samples will be collected during the calendar year quarter as specified (e.g., Q1).

2 **Bear Creek Hydrogeologic Regime**

BG - Bear Creek Burial Grounds Waste Management Area
EXP-B - Exit Pathway Picket B
EXP-C - Exit Pathway Picket C
EXP-SW - Spring or Surface Water Location
OLF - Oil Landfarm Waste Management Area
RS - Rust Spoil Area
S3 - S3 Site
SPI - Spoil Area I

Chestnut Ridge Hydrogeologic Regime

EXP-SW - Spring or surface water sampling location

Upper East Fork Poplar Creek Hydrogeologic Regime

B8110 - Building 81-10
B9201-2 - Building 9201-2
CPT - Coal Pile Trench
EXP-J - Maynardville Limestone Exit Pathway Picket J
EXP-SR - Exit pathway well in the gap through Pine Ridge along Scarboro Road
FTF - Fire Training Facility
GRID - Comprehensive Groundwater Monitoring Plan Grid Location
NHP - New Hope Pond
RG - Rust Garage Area
T0134 - Underground Storage Tank 0134-U
UOV - Uranium Oxide Vault
S2 - S-2 Site
Y12 - Y-12 Complex

North of Pine Ridge

EXP-NPR - Surface water sampling station located where drainage exits the Oak Ridge Reservation

Table B.1 (continued)

Notes: (continued)

3 BCK - Bear Creek Kilometer (surface water station)
GW - Groundwater monitoring well
GHK - Gum Hollow Kilometer (surface water station)
NPR - North of Pine Ridge (surface water station)
NT - North Tributary to Bear Creek
S17 - Surface water station in SCR5
SCR - South Chestnut Ridge (spring or surface water station)
SS - Spring sampling location: South Side of Bear Creek
(C) - A sample will be collected using the conventional sampling method the day after collecting the sample using the low-flow sampling method.

4 Q_ - Field duplicate samples will be collected at these locations during the quarter specified.

5 EXP - DOE Order Exit Pathway/Perimeter Monitoring
SMP - DOE Order Surveillance Monitoring

6 Y - Monitoring location selected to augment the fixed annual monitoring network (see Appendix C).

7 Table B.2 provides a comprehensive list of analytes, analytical methods, and the associated parameter group.

STD - Standard administrative parameter group, including the following elementary parameter groups:

FLD - Field measurements
CHEM - Miscellaneous laboratory analytes (e.g., dissolved solids) and anions
MET(1) - Metals
VOC(1) - Volatile organic compounds
RAD(1) - Gross alpha and gross beta activity

Radionuclide Elementary Parameter Groups:

RAD(3) - Uranium-234, -235, and -238
RAD(12) - Technetium-99
RAD(13) - Total uranium and weight percent of uranium-235

Special Sample Elementary Parameter Group:

STD/F - Standard administrative parameter group, plus a filtered sample for dissolved metals analyses; collected using the conventional sampling method with a 0.45-micron filter.

Table B.2. Field measurements and analytes that comprise the elementary parameter groups for CY 2005 groundwater and surface water samples

Parameter Group	Measurement or Analyte	Analytical Method [1]	Reporting Limit [2]	Units [3]
FLD	Depth to Water	NA	NA	ft
	Water Temperature	NA	NA	centigrade
	pH	NA	NA	pH units
	Conductivity	NA	NA	µmho/cm
	Dissolved Oxygen	NA	NA	ppm
	Oxidation-Reduction Potential	NA	NA	mV
CHEM (miscellaneous)	Total Dissolved Solids	EPA-160.1	1	mg/L
	Total Suspended Solids	EPA-160.2	1	mg/L
	Turbidity	EPA-180.1	0.1	NTU
CHEM (anions)	Alkalinity - HCO3	EPA-310.1	1.0	mg/L
	Alkalinity - CO3	EPA-310.1	1.0	mg/L
	Chloride	EPA-300.0	0.2	mg/L
	Fluoride	EPA-340.2	0.1	mg/L
	Nitrate (as Nitrogen)	EPA-300.0	0.028	mg/L
	Sulfate	EPA-300.0	0.25	mg/L
MET(1)	Aluminum	SW846-6010B	0.2	mg/L
	Antimony	EPA-200.8	0.0025	mg/L
	Arsenic	EPA-200.8	0.005	mg/L
	Barium	SW846-6010B	0.004	mg/L
	Beryllium	SW846-6010B	0.0005	mg/L
	Boron	SW846-6010B	0.1	mg/L
	Cadmium	EPA-200.8	0.0025	mg/L
	Calcium	SW846-6010B	0.2	mg/L
	Chromium	EPA-200.8	0.01	mg/L
	Cobalt	SW846-6010B	0.02	mg/L
	Copper	SW846-6010B	0.02	mg/L
	Iron	SW846-6010B	0.05	mg/L
	Lead	EPA-200.8	0.0005	mg/L
	Lithium	SW846-6010B	0.01	mg/L
	Magnesium	SW846-6010B	0.2	mg/L
	Manganese	SW846-6010B	0.005	mg/L
	Mercury	SW846-7470	0.0002	mg/L
	Molybdenum	SW846-6010B	0.05	mg/L
	Nickel	EPA-200.8	0.005	mg/L
	Potassium	SW846-6010B	2	mg/L
	Selenium	EPA-200.8	0.01	mg/L
	Silver	SW846-6010B	0.02	mg/L

Table B.2 (continued)

Parameter Group	Analyte	Analytical Method [1]	Reporting Limit [2]	Units [3]
MET(1) (continued)	Sodium	SW846-6010B	0.2	mg/L
	Strontium	SW846-6010B	0.005	mg/L
	Thallium	EPA-200.8	0.0005	mg/L
	Thorium	SW846-6010B	0.2	mg/L
	Uranium	EPA-200.8	0.0005	mg/L
	Vanadium	SW846-6010B	0.02	mg/L
	Zinc	SW846-6010B	0.05	mg/L
VOC(1)	Acetone	SW846-8260B-UP	10	µg/L
	Acrolein	SW846-8260B-UP	10	µg/L
	Acrylonitrile	SW846-8260B-UP	5	µg/L
	Benzene	SW846-8260B-UP	5	µg/L
	Bromochloromethane	SW846-8260B-UP	5	µg/L
	Bromodichloromethane	SW846-8260B-UP	5	µg/L
	Bromoform	SW846-8260B-UP	5	µg/L
	Bromomethane	SW846-8260B-UP	5	µg/L
	2-Butanone	SW846-8260B-UP	5	µg/L
	Carbon disulfide	SW846-8260B-UP	5	µg/L
	Carbon tetrachloride	SW846-8260B-UP	5	µg/L
	Chlorobenzene	SW846-8260B-UP	5	µg/L
	Chloroethane	SW846-8260B-UP	5	µg/L
	2-Chloroethylvinyl ether	SW846-8260B-UP	10	µg/L
	Chloroform	SW846-8260B-UP	5	µg/L
	Chloromethane	SW846-8260B-UP	5	µg/L
	Dibromochloromethane	SW846-8260B-UP	5	µg/L
	1,2-Dibromo-3-chloropropane	SW846-8260B-UP	10	µg/L
	1,2-Dibromoethane	SW846-8260B-UP	5	µg/L
	Dibromomethane	SW846-8260B-UP	5	µg/L
	1,2-Dichlorobenzene	SW846-8260B-UP	5	µg/L
	1,4-Dichlorobenzene	SW846-8260B-UP	5	µg/L
	1,4-Dichloro-2-butene	SW846-8260B-UP	5	µg/L
	trans-1,4-Dichloro-2-butene	SW846-8260B-UP	5	µg/L
	Dichlorodifluoromethane	SW846-8260B-UP	5	µg/L
	1,1-Dichloroethane	SW846-8260B-UP	5	µg/L
	1,2-Dichloroethane	SW846-8260B-UP	5	µg/L
	1,1-Dichloroethene	SW846-8260B-UP	5	µg/L
	cis-1,2-Dichloroethene	SW846-8260B-UP	5	µg/L
	trans-1,2-Dichloroethene	SW846-8260B-UP	5	µg/L
	1,2-Dichloropropane	SW846-8260B-UP	5	µg/L

Table B.2 (continued)

Parameter Group	Analyte	Analytical Method [1]	Reporting Limit [2]	Units [3]
VOC(1) (continued)	cis-1,3-Dichloropropene	SW846-8260B-UP	5	µg/L
	trans-1,3-Dichloropropene	SW846-8260B-UP	5	µg/L
	Ethanol	SW846-8260B-UP	200	µg/L
	Ethylbenzene	SW846-8260B-UP	5	µg/L
	Ethyl methacrylate	SW846-8260B-UP	5	µg/L
	2-Hexanone	SW846-8260B-UP	5	µg/L
	Iodomethane	SW846-8260B-UP	5	µg/L
	4-Methyl-2-pentanone	SW846-8260B-UP	5	µg/L
	Methylene chloride	SW846-8260B-UP	5	µg/L
	Styrene	SW846-8260B-UP	5	µg/L
	1,1,1,2-Tetrachloroethane	SW846-8260B-UP	5	µg/L
	1,1,2,2-Tetrachloroethane	SW846-8260B-UP	5	µg/L
	Tetrachloroethene	SW846-8260B-UP	5	µg/L
	Toluene	SW846-8260B-UP	5	µg/L
	Total Xylene	SW846-8260B-UP	5	µg/L
	1,1,1-Trichloroethane	SW846-8260B-UP	5	µg/L
	1,1,2-Trichloroethane	SW846-8260B-UP	5	µg/L
	Trichloroethene	SW846-8260B-UP	5	µg/L
	Trichlorofluoromethane	SW846-8260B-UP	5	µg/L
	1,2,3-Trichloropropane	SW846-8260B-UP	10	µg/L
	1,1,2-Trichloro-1,2,2-trifluoroethane	SW846-8260B-UP	5	µg/L
	Vinyl acetate	SW846-8260B-UP	10	µg/L
	Vinyl chloride	SW846-8260B-UP	2	µg/L
RAD(1)	Gross Alpha Activity	EPA-900.0	3.5	pCi/L
RAD(1)	Gross Beta Activity	EPA-900.0	7.0	pCi/L
RAD(3)	Uranium-234, -235, & -238	Y/P65-7061	0.4	pCi/L
RAD(12)	Technetium-99	Y/P65-7060	10	pCi/L
RAD(13)	Total Uranium and weight % U-235	Y/P65-8044	0.002	mg/L

Notes:

1 NA - not applicable

Field measurement procedures:

- BWXT 2000a, BWXT 2002a, BWXT 2004a, and BWXT 2004b

Analytical methods from:

- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (U.S. Environmental Protection Agency 1996)
- *Methods for Chemical Analysis of Water and Wastes* (U.S. Environmental Protection Agency 1983)
- BWXT Analytical Chemistry Organization Controlled Procedures: (Y/P65-7060 and Y/P65-7061)

Table B.2 (continued)

Notes: (continued)

2 NA - not applicable

VOC(1) - Reporting limits are contract-required quantitation limits; also report estimated values (with qualifier) below this limit and above the instrument detection limit.

RAD(1,3,12) - Reporting limits are target minimum detectable activities (MDAs) that may be obtained under optimal analytical conditions; actual MDAs are sample-specific and may vary significantly from the target value.

3 ft - feet
µg/L - micrograms per liter
µmho/cm - micromhos per centimeter
mg/L - milligrams per liter
mV - millivolts
NTU - nephelometric turbidity units
ppm - parts per million
pCi/L - picoCuries per liter

APPENDIX C

SAMPLING PRIORITY SCORES

Sampling Priority Scores for CY 2005

Rank	Sampling Priority Score [1]	Well No.	Hydro. Regime [2]	Most Recent Sample [3]	Points Scored [4]					Selected for CY 2005 [5]
					Regime	Time since sampled last	No. of Samples	Contaminant Concentrations	Trending Potential	
1	19	GW-243	BC	08/13/02	5	1	-5	8	10	
2	19	GW-246	BC	08/15/04	5	0	-5	9	10	
3	17	GW-052	BC	08/15/04	5	0	-1	3	10	
4	**16**	**GW-097**	**BC**	**07/15/98**	**5**	**5**	**-5**	**1**	**10**	**X**
5	**16**	**GW-624**	**BC**	**07/15/98**	**5**	**5**	**-2**	**1**	**7**	**X**
6	**16**	**GW-242**	**BC**	**03/08/99**	**5**	**4**	**-5**	**2**	**10**	**X**
7	**16**	**GW-346**	**BC**	**03/09/99**	**5**	**4**	**-4**	**2**	**9**	**X**
8	**16**	**GW-228**	**BC**	**09/09/99**	**5**	**4**	**-5**	**2**	**10**	**X**
9	**15**	**GW-064**	**BC**	**07/20/98**	**5**	**5**	**-5**	**1**	**9**	**X**
10	**15**	**GW-601**	**BC**	**03/08/99**	**5**	**4**	**-5**	**3**	**8**	**X**
11	**15**	**GW-066**	**BC**	**08/13/02**	**5**	**1**	**3**	**1**	**5**	**X**
12	15	GW-101	BC	08/15/04	5	0	-3	3	10	
13	15	GW-257	BC	08/15/04	5	0	-2	2	10	
14	15	GW-615	BC	08/15/04	5	0	-5	5	10	
15	**14**	**GW-227**	**BC**	**09/12/92**	**5**	**5**	**-5**	**4**	**5**	**X**
16	**14**	**GW-365**	**BC**	**08/07/01**	**5**	**2**	**-5**	**2**	**10**	**X**
17	**14**	**GW-124**	**BC**	**08/09/01**	**5**	**2**	**-5**	**2**	**10**	**X**
18	**14**	**GW-616**	**BC**	**08/09/01**	**5**	**2**	**-5**	**2**	**10**	**X**
19	**14**	**GW-061**	**BC**	**08/05/02**	**5**	**1**	**-5**	**3**	**10**	**X**
20	**13**	**GW-312**	**BC**	**08/06/95**	**5**	**5**	**-5**	**2**	**6**	**X**
21	**13**	**GW-053**	**BC**	**07/25/01**	**5**	**2**	**-5**	**1**	**10**	**X**
22	**13**	**GW-364**	**BC**	**08/07/01**	**5**	**2**	**-5**	**1**	**10**	**X**
23	**13**	**GW-626**	**BC**	**07/25/02**	**5**	**1**	**-5**	**2**	**10**	**X**
24	**13**	**GW-072**	**BC**	**08/06/02**	**5**	**1**	**-5**	**2**	**10**	**X**
25	**13**	**GW-288**	**BC**	**08/07/02**	**5**	**1**	**-5**	**2**	**10**	**X**
26	**13**	**GW-291**	**BC**	**08/07/02**	**5**	**1**	**-5**	**2**	**10**	**X**
27	**13**	**GW-289**	**BC**	**08/08/02**	**5**	**1**	**-5**	**2**	**10**	**X**
28	**13**	**GW-014**	**BC**	**08/12/02**	**5**	**1**	**-5**	**2**	**10**	**X**
29	**12**	**GW-245**	**BC**	**01/17/90**	**5**	**5**	**-5**	**6**	**1**	**X**
30	**12**	**GW-127**	**BC**	**01/18/90**	**5**	**5**	**-5**	**5**	**2**	**X**
31	**12**	**GW-277**	**BC**	**01/23/90**	**5**	**5**	**-5**	**5**	**2**	**X**
32	**12**	**GW-694**	**BC**	**07/17/02**	**5**	**1**	**-5**	**1**	**10**	**X**
33	**12**	**GW-736**	**BC**	**07/17/02**	**5**	**1**	**-5**	**2**	**9**	**X**
34	**12**	**GW-737**	**BC**	**07/18/02**	**5**	**1**	**-5**	**2**	**9**	**X**
35	12	GW-100	BC	08/15/04	5	0	-5	2	10	
36	12	GW-236	BC	08/15/04	5	0	-5	2	10	
37	**11**	**GW-247**	**BC**	**01/17/90**	**5**	**5**	**-5**	**5**	**1**	**X**
38	**11**	**GW-244**	**BC**	**01/18/90**	**5**	**5**	**-5**	**5**	**1**	**X**
39	**11**	**GW-368**	**BC**	**01/31/90**	**5**	**5**	**-2**	**2**	**1**	**X**
40	**11**	**GW-068**	**BC**	**03/12/90**	**5**	**5**	**-3**	**2**	**2**	**X**
41	**11**	**GW-723**	**BC**	**07/23/02**	**5**	**1**	**-5**	**1**	**9**	**X**
42	**11**	**GW-739**	**BC**	**07/22/02**	**5**	**1**	**-5**	**1**	**9**	**X**
43	11	GW-710	BC	07/14/03	5	0	-5	1	10	
44	10	GW-259	BC	03/05/90	5	5	-3	2	1	
45	**10**	**GW-122**	**BC**	**04/13/91**	**5**	**5**	**-5**	**2**	**3**	**X**
46	**10**	**GW-307**	**BC**	**04/26/91**	**5**	**5**	**-5**	**3**	**2**	**X**
47	**10**	**GW-645**	**BC**	**08/02/92**	**5**	**5**	**-2**	**1**	**1**	**X**
48	10	GW-314	BC	08/15/92	5	5	-5	2	3	
49	10	GW-309	BC	08/30/92	5	5	-5	2	3	
50	10	GW-835	BC	08/21/03	5	0	-5	5	5	
51	9	GW-258	BC	03/05/90	5	5	-3	1	1	
52	9	GW-306	BC	04/26/91	5	5	-5	2	2	
53	9	GW-308	BC	04/30/91	5	5	-5	2	2	
54	**9**	**GW-310**	**BC**	**04/30/91**	**5**	**5**	**-5**	**2**	**2**	**X**
55	9	GW-018	BC	06/20/91	5	5	4	0	-5	

Sampling Priority Scores for CY 2005

Rank	Sampling Priority Score [1]	Well No.	Hydro. Regime [2]	Most Recent Sample [3]	Points Scored [4]					Selected for CY 2005 [5]
					Regime	Time since sampled last	No. of Samples	Contaminant Concentrations	Trending Potential	
56	**9**	**GW-313**	**BC**	**08/15/92**	**5**	**5**	**-5**	**1**	**3**	**X**
57	9	GW-623	BC	09/27/92	5	5	-3	1	1	
58	8	GW-010	BC	02/01/90	5	5	-5	2	1	
59	8	GW-369	BC	05/15/91	5	5	-5	2	1	
60	8	GW-829	BC	08/01/01	5	2	-5	1	5	
61	8	56-3C	EF	03/12/97	-5	5	5	2	1	
62	8	55-2B	EF	11/20/04	-5	0	2	4	7	
63	7	GW-367	BC	05/11/91	5	5	-5	1	1	
64	7	GW-089	BC	08/13/92	5	5	-5	1	1	
65	7	GW-006	BC	08/02/00	5	3	-3	1	1	
66	6	GW-249	BC	02/16/90	5	5	1	0	-5	
67	6	GW-274	EF	10/22/03	-5	0	-5	6	10	
68	6	GW-692	EF	11/20/04	-5	0	3	1	7	
69	5	GW-091	BC	08/08/02	5	1	4	0	-5	
70	5	GW-237	BC	08/15/04	5	0	4	1	-5	
71	5	GW-265	EF	03/13/97	-5	5	-5	1	9	
72	5	GW-332	EF	08/04/98	-5	5	-5	2	8	
73	5	GW-148	EF	11/09/99	-5	4	-5	1	10	
74	5	GW-109	EF	10/06/03	-5	0	-5	5	10	
75	4	GW-045	BC	02/08/90	5	5	-1	0	-5	
76	4	GW-275	EF	10/22/03	-5	0	-5	4	10	
77	4	GW-700	EF	11/10/03	-5	0	1	2	6	
78	4	GW-690	EF	11/18/03	-5	0	1	2	6	
79	4	GW-222	EF	11/20/04	-5	0	-5	4	10	
80	3	GW-375	BC	02/06/90	5	5	-2	0	-5	
81	3	GW-648	BC	07/23/92	5	5	-2	0	-5	
82	3	GW-646	BC	08/03/92	5	5	-2	0	-5	
83	3	GW-619	EF	07/21/98	-5	5	-5	1	7	
84	3	GW-659	EF	07/28/98	-5	5	-5	2	6	
85	3	GW-180	CR	08/21/01	-5	2	-5	1	10	
86	3	GW-192	EF	10/17/01	-5	2	-5	1	10	
87	3	GW-240	EF	10/22/01	-5	2	-5	1	10	
88	3	GW-656	EF	11/12/01	-5	2	-5	2	9	
89	2	GW-183	EF	03/18/97	-5	5	-5	2	5	
90	2	GW-617	EF	11/05/97	-5	5	-5	1	6	
91	2	GW-105	EF	10/02/03	-5	0	-5	2	10	
92	2	GW-106	EF	10/02/03	-5	0	-5	2	10	
93	2	GW-270	EF	10/20/03	-5	0	-5	2	10	
94	2	GW-269	EF	10/23/03	-5	0	-5	2	10	
95	2	GW-272	EF	10/23/03	-5	0	-5	2	10	
96	2	GW-336	EF	11/17/03	-5	0	-5	2	10	
97	2	GW-176	CR	11/20/04	-5	0	-5	2	10	
98	2	GW-179	CR	11/20/04	-5	0	-5	2	10	
99	2	GW-322	CR	11/20/04	-5	0	-5	2	10	
100	2	GW-612	CR	11/20/04	-5	0	-5	2	10	
101	1	GW-531	BC	06/24/91	5	5	-4	0	-5	
102	1	GW-086	BC	10/21/93	5	5	-4	0	-5	
103	1	GW-248	BC	08/08/95	5	5	-4	0	-5	
104	1	GW-629	BC	07/16/98	5	5	-4	0	-5	
105	1	GW-505	EF	10/06/03	-5	0	-5	1	10	
106	1	GW-273	EF	10/21/03	-5	0	-5	1	10	
107	1	GW-337	EF	11/17/03	-5	0	-5	1	10	
108	1	56-2C	EF	11/18/03	-5	0	-1	2	5	
109	1	GW-173	CR	11/20/04	-5	0	-5	1	10	
110	1	GW-175	CR	11/20/04	-5	0	-5	1	10	

Sampling Priority Scores for CY 2005

Rank	Sampling Priority Score [1]	Well No.	Hydro. Regime [2]	Most Recent Sample [3]	Points Scored [4]					Selected for CY 2005 [5]
					Regime	Time since sampled last	No. of Samples	Contaminant Concentrations	Trending Potential	
111	1	GW-178	CR	11/20/04	-5	0	-5	1	10	
112	0	GW-073	BC	01/30/90	5	5	-5	0	-5	
113	0	GW-120	BC	01/30/90	5	5	-5	0	-5	
114	0	GW-094	BC	02/15/90	5	5	-5	0	-5	
115	0	GW-250	BC	02/16/90	5	5	-5	0	-5	
116	0	GW-067	BC	03/13/90	5	5	-5	0	-5	
117	0	GW-074	BC	08/03/92	5	5	-5	0	-5	
118	0	GW-630	BC	08/29/92	5	5	-5	0	-5	
119	0	GW-054	BC	09/02/92	5	5	-5	0	-5	
120	0	GW-083	BC	09/02/92	5	5	-5	0	-5	
121	0	GW-366	BC	09/07/92	5	5	-5	0	-5	
122	0	GW-520	BC	09/07/92	5	5	-5	0	-5	
123	0	GW-075	BC	09/08/92	5	5	-5	0	-5	
124	0	GW-125	BC	09/17/92	5	5	-5	0	-5	
125	0	GW-058	BC	09/24/92	5	5	-5	0	-5	
126	0	GW-622	BC	09/25/92	5	5	-5	0	-5	
127	**0**	**GW-286**	**BC**	**10/07/93**	**5**	**5**	**-5**	**0**	**-5**	**X**
128	0	GW-651	BC	10/10/93	5	5	-5	0	-5	
129	0	GW-641	BC	10/14/93	5	5	-5	0	-5	
130	0	GW-316	BC	10/24/93	5	5	-5	0	-5	
131	0	GW-323	BC	10/23/93	5	5	-5	0	-5	
132	0	GW-636	BC	12/18/93	5	5	-5	0	-5	
133	0	GW-638	BC	12/18/93	5	5	-5	0	-5	
134	0	GW-013	BC	12/19/93	5	5	-5	0	-5	
135	0	GW-325	BC	02/15/94	5	5	-5	0	-5	
136	0	GW-637	BC	07/19/95	5	5	-5	0	-5	
137	0	GW-047	BC	07/24/95	5	5	-5	0	-5	
138	0	GW-057	BC	08/05/95	5	5	-5	0	-5	
139	0	GW-800	BC	08/05/95	5	5	-5	0	-5	
140	0	GW-290	BC	08/07/95	5	5	-5	0	-5	
141	0	GW-370	BC	08/08/95	5	5	-5	0	-5	
142	0	GW-317	BC	08/15/95	5	5	-5	0	-5	
143	0	GW-347	BC	08/15/95	5	5	-5	0	-5	
144	0	GW-348	BC	08/21/95	5	5	-5	0	-5	
145	0	GW-652	BC	09/19/95	5	5	-5	0	-5	
146	0	GW-654	BC	12/09/95	5	5	-5	0	-5	
147	0	GW-794	BC	08/26/96	5	5	-5	0	-5	
148	0	GW-795	BC	08/26/96	5	5	-5	0	-5	
149	0	GW-095	BC	08/27/96	5	5	-5	0	-5	
150	0	GW-613	BC	08/11/97	5	5	-5	0	-5	
151	0	GW-084	BC	08/13/97	5	5	-5	0	-5	
152	0	GW-372	BC	08/14/97	5	5	-5	0	-5	
153	0	GW-642	BC	08/14/97	5	5	-5	0	-5	
154	0	GW-001	BC	.	5	.	.	.	-5	
155	0	GW-012	BC	.	5	.	.	.	-5	
156	0	GW-016	BC	.	5	.	.	.	-5	
157	0	GW-041	BC	.	5	.	.	.	-5	
158	0	GW-055	BC	.	5	.	.	.	-5	
159	0	GW-059	BC	.	5	.	.	.	-5	
160	0	GW-065	BC	.	5	.	.	.	-5	
161	0	GW-090	BC	.	5	.	.	.	-5	
162	0	55-1C	EF	06/07/96	-5	5	5	0	-5	
163	0	56-1C	EF	03/13/97	-5	5	5	0	-5	
164	0	GW-699	EF	03/12/97	-5	5	5	0	-5	
165	0	GW-819	EF	03/26/98	-5	5	5	0	-5	

Sampling Priority Scores for CY 2005

Rank	Sampling Priority Score [1]	Well No.	Hydro. Regime [2]	Most Recent Sample [3]	Points Scored [4]					Selected for CY 2005 [5]
					Regime	Time since sampled last	No. of Samples	Contaminant Concentrations	Trending Potential	
166	0	GW-775	EF	10/31/02	-5	1	-5	1	8	
167	0	55-2C	EF	11/18/03	-5	0	-5	4	6	
168	-1	GW-126	BC	03/02/99	5	4	-5	0	-5	
169	-1	GW-345	BC	03/09/99	5	4	-5	0	-5	
170	-1	GW-334	EF	04/13/91	-5	5	-4	2	1	
171	-1	55-3C	EF	04/24/97	-5	5	4	0	-5	
172	-1	GW-783	EF	05/01/00	-5	3	-5	2	4	
173	-1	GW-820	EF	10/13/03	-5	0	-1	1	4	
174	-2	GW-621	BC	07/13/00	5	3	-5	0	-5	
175	**-2**	**GW-287**	**BC**	**08/21/00**	**5**	**3**	**-5**	**0**	**-5**	**X**
176	-2	GW-107	EF	01/19/90	-5	5	-5	1	2	
177	-2	GW-282	EF	07/29/92	-5	5	-5	1	2	
178	-2	GW-508	EF	03/02/94	-5	5	-5	1	2	
179	-3	GW-056	BC	03/14/01	5	2	-5	0	-5	
180	-3	GW-685	BC	03/14/01	5	2	-5	0	-5	
181	-4	GW-069	BC	08/05/02	5	1	-5	0	-5	
182	-4	GW-778	EF	05/18/95	-5	5	1	0	-5	
183	-4	GW-686	EF	11/14/02	-5	1	4	1	-5	
184	-4	56-2A	EF	11/20/04	-5	0	4	2	-5	
185	-4	56-2B	EF	11/20/04	-5	0	4	2	-5	
186	-4	GW-691	EF	11/20/04	-5	0	4	2	-5	
187	-5	GW-711	BC	07/14/03	5	0	-5	0	-5	
188	-5	GW-123	BC	08/04/03	5	0	-5	0	-5	
189	-5	55-1B	EF	10/14/02	-5	1	4	0	-5	
190	-5	55-1A	EF	11/20/04	-5	0	4	1	-5	
191	-5	GW-679	CR	11/20/04	-5	0	5	.	-5	
192	-5	GW-680	CR	11/20/04	-5	0	5	.	-5	
193	-5	GW-818	EF	11/20/04	-5	0	4	1	-5	
194	-6	60-1B	EF	10/13/03	-5	0	4	0	-5	
195	-6	55-6A	EF	11/20/04	-5	0	4	0	-5	
196	-7	GW-167	EF	02/14/96	-5	5	-2	0	-5	
197	-7	59-1A	EF	10/30/03	-5	0	3	0	-5	
198	-8	GW-200	EF	10/10/88	-5	5	-3	0	-5	
199	-8	GW-202	EF	10/10/88	-5	5	-3	0	-5	
200	-8	GW-218	EF	11/06/00	-5	3	-1	0	-5	
201	-8	59-1C	EF	10/30/03	-5	0	2	0	-5	
202	-8	59-1B	EF	11/20/04	-5	0	2	0	-5	
203	-9	GW-150	EF	03/08/88	-5	5	-4	0	-5	
204	-9	GW-335	EF	04/10/91	-5	5	-4	0	-5	
205	-10	GW-197	EF	02/03/90	-5	5	-5	0	-5	
206	-10	GW-196	EF	02/21/90	-5	5	-5	0	-5	
207	-10	GW-152	EF	02/28/90	-5	5	-5	0	-5	
208	-10	GW-268	EF	03/13/90	-5	5	-5	0	-5	
209	-10	GW-283	EF	10/14/93	-5	5	-5	0	-5	
210	-10	GW-239	EF	10/30/93	-5	5	-5	0	-5	
211	-10	GW-657	EF	11/15/93	-5	5	-5	0	-5	
212	-10	GW-252	EF	05/17/95	-5	5	-5	0	-5	
213	-10	GW-255	EF	05/17/95	-5	5	-5	0	-5	
214	-10	GW-261	EF	05/16/95	-5	5	-5	0	-5	
215	-10	GW-263	EF	05/16/95	-5	5	-5	0	-5	
216	-10	GW-304	CR	07/12/95	-5	5	-5	0	-5	
217	-10	GW-303	CR	07/16/95	-5	5	-5	0	-5	
218	-10	GW-181	CR	11/06/95	-5	5	-5	0	-5	
219	-10	GW-511	CR	11/07/95	-5	5	-5	0	-5	
220	-10	GW-759	EF	11/14/95	-5	5	-5	0	-5	

Sampling Priority Scores for CY 2005

Rank	Sampling Priority Score [1]	Well No.	Hydro. Regime [2]	Most Recent Sample [3]	Points Scored [4]					Selected for CY 2005 [5]
					Regime	Time since sampled last	No. of Samples	Contaminant Concentrations	Trending Potential	
221	-10	GW-199	EF	11/16/95	-5	5	-5	0	-5	
222	-10	GW-773	EF	11/18/95	-5	5	-5	0	-5	
223	-10	GW-774	EF	11/18/95	-5	5	-5	0	-5	
224	-10	GW-546	CR	04/09/96	-5	5	-5	0	-5	
225	-10	GW-541	CR	04/15/96	-5	5	-5	0	-5	
226	-10	GW-160	CR	04/29/96	-5	5	-5	0	-5	
227	-10	GW-184	CR	04/30/96	-5	5	-5	0	-5	
228	-10	GW-186	CR	05/01/96	-5	5	-5	0	-5	
229	-10	GW-188	CR	04/30/96	-5	5	-5	0	-5	
230	-10	GW-298	CR	05/01/96	-5	5	-5	0	-5	
231	-10	GW-299	CR	04/30/96	-5	5	-5	0	-5	
232	-10	GW-512	CR	05/02/96	-5	5	-5	0	-5	
233	-10	GW-292	CR	05/08/96	-5	5	-5	0	-5	
234	-10	GW-293	CR	05/08/96	-5	5	-5	0	-5	
235	-10	GW-766	EF	10/09/96	-5	5	-5	0	-5	
236	-10	GW-767	EF	10/09/96	-5	5	-5	0	-5	
237	-10	GW-191	EF	11/06/96	-5	5	-5	0	-5	
238	-10	GW-194	EF	11/07/96	-5	5	-5	0	-5	
239	-10	GW-195	EF	11/07/96	-5	5	-5	0	-5	
240	-10	GW-779	EF	11/07/96	-5	5	-5	0	-5	
241	-10	GW-780	EF	11/07/96	-5	5	-5	0	-5	
242	-10	GW-149	EF	11/14/96	-5	5	-5	0	-5	
243	-10	GW-751	EF	11/18/96	-5	5	-5	0	-5	
244	-10	GW-752	EF	11/18/96	-5	5	-5	0	-5	
245	-10	GW-384	EF	11/21/96	-5	5	-5	0	-5	
246	-10	GW-385	EF	11/19/96	-5	5	-5	0	-5	
247	-10	GW-603	EF	11/25/96	-5	5	-5	0	-5	
248	-10	GW-817	EF	12/04/97	-5	5	-5	0	-5	
249	-10	GW-745	EF	12/09/97	-5	5	-5	0	-5	
250	-10	GW-746	EF	12/09/97	-5	5	-5	0	-5	
251	-10	GW-748	EF	12/10/97	-5	5	-5	0	-5	
252	-10	GW-749	EF	12/10/97	-5	5	-5	0	-5	
253	-10	GW-754	EF	07/28/98	-5	5	-5	0	-5	
254	-10	GW-756	EF	07/27/98	-5	5	-5	0	-5	
255	-10	GW-753	EF	07/29/98	-5	5	-5	0	-5	
256	-10	GW-338	EF	08/20/98	-5	5	-5	0	-5	
257	-10	1082	CR	.	-5	.	.	.	-5	
258	-10	1084	CR	.	-5	.	.	.	-5	
259	-10	55-2A	EF	.	-5	.	.	.	-5	
260	-10	55-3A	EF	.	-5	.	.	.	-5	
261	-10	55-3B	EF	.	-5	.	.	.	-5	
262	-10	56-1A	EF	.	-5	.	.	.	-5	
263	-10	56-3A	EF	.	-5	.	.	.	-5	
264	-10	56-3B	EF	.	-5	.	.	.	-5	
265	-10	56-4A	EF	.	-5	.	.	.	-5	
266	-10	56-6A	EF	.	-5	.	.	.	-5	
267	-10	56-8A	EF	.	-5	.	.	.	-5	
268	-10	58-2A	EF	.	-5	.	.	.	-5	
269	-10	60-1A	EF	.	-5	.	.	.	-5	
270	-10	GW-558	CR	.	-5	.	.	.	-5	
271	-10	GW-559	CR	.	-5	.	.	.	-5	
272	-10	GW-674	CR	.	-5	.	.	.	-5	
273	-10	GW-676	CR	.	-5	.	.	.	-5	
274	-10	GW-677	CR	.	-5	.	.	.	-5	
275	-10	GW-678	CR	.	-5	.	.	.	-5	

Sampling Priority Scores for CY 2005

Rank	Sampling Priority Score [1]	Well No.	Hydro. Regime [2]	Most Recent Sample [3]	Points Scored [4]					Selected for CY 2005 [5]
					Regime	Time since sampled last	No. of Samples	Contaminant Concentrations	Trending Potential	
276	-10	GW-734	EF	.	-5	.	.	.	-5	
277	-11	GW-788	EF	10/20/99	-5	4	-5	0	-5	
278	-11	GW-781	EF	10/26/99	-5	4	-5	0	-5	
279	-11	GW-792	EF	11/28/99	-5	4	-5	0	-5	
280	-13	GW-609	CR	01/10/01	-5	2	-5	0	-5	
281	-13	GW-241	CR	08/16/01	-5	2	-5	0	-5	
282	-13	GW-514	CR	08/16/01	-5	2	-5	0	-5	
283	-13	GW-174	CR	08/21/01	-5	2	-5	0	-5	
284	-13	GW-608	CR	08/20/01	-5	2	-5	0	-5	
285	-13	GW-789	EF	10/15/01	-5	2	-5	0	-5	
286	-13	GW-349	EF	10/14/02	-5	1	-4	0	-5	
287	-13	GW-350	EF	10/15/02	-5	1	-4	0	-5	
288	-14	GW-539	CR	07/17/02	-5	1	-5	0	-5	
289	-14	GW-776	EF	10/31/02	-5	1	-5	0	-5	
290	-15	GW-302	CR	08/12/03	-5	0	-5	0	-5	
291	-15	GW-339	CR	08/11/03	-5	0	-5	0	-5	
292	-15	GW-142	CR	10/08/03	-5	0	-5	0	-5	
293	-15	GW-631	EF	10/07/03	-5	0	-5	0	-5	
294	-15	GW-190	EF	10/21/03	-5	0	-5	0	-5	
295	-15	GW-271	EF	10/20/03	-5	0	-5	0	-5	
296	-15	GW-761	EF	10/29/03	-5	0	-5	0	-5	
297	-15	GW-300	CR	11/20/04	-5	0	-5	0	-5	
298	-15	GW-513	CR	11/20/04	-5	0	-5	0	-5	
299	-15	GW-610	CR	11/20/04	-5	0	-5	0	-5	
300	-15	GW-611	CR	11/20/04	-5	0	-5	0	-5	
301	-15	GW-742	CR	11/20/04	-5	0	-5	0	-5	
302	-15	GW-743	CR	11/20/04	-5	0	-5	0	-5	
303	-15	GW-760	EF	11/20/04	-5	0	-5	0	-5	
304	-15	GW-765	EF	11/20/04	-5	0	-5	0	-5	
305	-15	GW-786	EF	11/20/04	-5	0	-5	0	-5	
306	-15	GW-787	EF	11/20/04	-5	0	-5	0	-5	

Notes:

1 The Sampling Priority Score is the sum of the points scored.

2 BC = Bear Creek Hydrogeologic Regime
CR = Chestnut Ridge Hydrogeologic Regime
EF = Upper East Fork Poplar Creek Hydrogeologic Regime

3 Because sampling for CY 2004 is incomplete, the most recent sample dates for locations sampled during CY 2004 are default values based on the sampling schedule: first and third quarter locations use 08/15/03 as a default, and second and fourth quarter locations use 11/20/03. Some wells with relatively high ranking were not selected for CY 2004 because they were sampled within the previous year.

4 Point values are assigned in accordance with the monitoring optimization plan (see example on the following page).

5 X = well selected for monitoring during CY 2005 (emphasized by shading the entire row).

Example of the CY 2005 sampling priority scoring: Well GW-097

Criteria			Point Value	Score
Is the well located in the hydrogeologic regime that is the focus of the GWPP sampling program?				
	YES	x	5	5
	NO		-5	
How long since groundwater samples were collected from the well (beginning in January 1986)?	**Years**			
	>	x	5	5
	5		4	
	4		3	
	3		2	
	2		1	
	<		0	
How many samples have been collected from the well since January 1986?	**Total Number of Samples**			
	>9	x	-5	-5
	9		-4	
	8		-3	
	7		-2	
	6		-1	
	5		1	
	4		2	
	3		3	
	2		4	
	1		5	

Do the concentrations of the following contaminants in the well exceed the specified criteria?

		Concentration Relative to the MCL							
		NO3	U	VOC	GA	GB	OTHER		
	MCL:	10	0.03	5	15	50	.		
	Units:	m/L	mg/L	ug/L	pCi/L	pCi/L	.		
YES	> MCL			x				1	1
	10 X MCL							2	
	100 X MCL							2	
	1000 X MCL							1	
NO								-5	

Does the well provide a long-term contaminant concentration trend?	**Length of Trend (Years)**			
	YES >	x	10	10
	10		9	
	9		8	
	8		7	
	7		6	
	6		5	
	5		4	
	4		3	
	3		2	
	<		1	
	NO		-5	

SAMPLING PRIORITY SCORE: 16

APPENDIX D

LABORATORY REQUIREMENTS
(Bottle Lists, Holding Times, Turnaround Time, Elevated Minimum Activity)

STD

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 - 250 mL polyethylene
Total Suspended Solids	None	1 - 250 mL polyethylene
Total Dissolved Solids	None	1 - 250 mL polyethylene
Carbonate, Bicarbonate	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 - 500 mL polyethylene
Radiochemistry (UV / Y-12)	HNO_3	1 – 500 mL polyethylene
VOA	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 - 40 mL amber glass with Teflon lined septum lid

STD: **ESLIMS LAB TEST ID**

FLD GWTRSAMP
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY
MET(1)ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW
RAD(1)GROSSAB-ENV

[1] Samples chilled to 4 +/- 2C

STD, Rad (13)

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 - 250 mL polyethylene
Total Suspended Solids	None	1 - 250 mL polyethylene
Total Dissolved Solids	None	1 - 250 mL polyethylene
Carbonate, Bicarbonate	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 - 500 mL polyethylene
Radiochemistry (UV / Y-12)	HNO_3	1 – 500 mL polyethylene
TIMS	HNO_3	1 - 250 mL polyethylene
VOA	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 - 40 mL amber glass with Teflon lined septum lid

STD: **ESLIMS LAB TEST ID**

FLD GWTRSAMP
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY
MET(1)ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW
RAD(1)GROSSAB-ENV
RAD(13) wt% ^{235}U and ug/g Total U (TOTAL-U-ENV)

[1] Samples chilled to 4 +/- 2C

STD/F

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 - 250 mL polyethylene
Total Suspended Solids	None	1 - 250 mL polyethylene
Total Dissolved Solids	None	1 - 250 mL polyethylene
Carbonate, Bicarbonate	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 - 500 mL polyethylene
Filtered Metals (ICP, ICP-MS, and Hg)	HNO_3	1 - 500 mL polyethylene
Radiochemistry (UV / Y-12)	HNO_3	1 – 500 mL polyethylene
VOA	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 - 40 mL amber glass with Teflon lined septum lid

STD:	**ESLIMS LAB TEST ID**
FLD	GWTRSAMP
CHEM	ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, TURBIDITY SOLIDS-TOT-D
MET(1)/F	ICP6010, ICPMSGW and HG7470
VOC(1)	VOA8260GW
RAD(1)	GROSSAB-ENV

[1] Samples chilled to 4 +/- 2C

STD/F, Rad(13)

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 - 250 mL polyethylene
Total Suspended Solids	None	1 - 250 mL polyethylene
Total Dissolved Solids	None	1 - 250 mL polyethylene
Carbonate, Bicarbonate	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 - 500 mL polyethylene
Filtered Metals (ICP, ICP-MS, and Hg)	HNO_3	1 - 500 mL polyethylene
Radiochemistry (UV / Y-12)	HNO_3	1 – 500 mL polyethylene
TIMS	HNO_3	1 – 250 mL polyethylene
VOA	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 - 40 mL amber glass with Teflon lined septum lid

STD:	**ESLIMS LAB TEST ID**
FLD	GWTRSAMP
CHEM	ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, TURBIDITY
	SOLIDS-TOT-D
MET(1)/F	ICP6010, ICPMSGW and HG7470
VOC(1)	VOA8260GW
RAD(1)	GROSSAB-ENV
RAD(13)	wt% ^{235}U and ug/g Total U (TOTAL-U-ENV)

[1] Samples chilled to 4 +/- 2C

VOC (1)

Parameter	Chemical Preservative [1]	Bottle Types/Size
VOA	None	2 – 40 mL amber glass with Teflon lined septum lid

VOC(1) VOA8260GW

[1] Samples chilled to 4 +/- 2C

STD, RAD (3)

Parameter	Chemical Preservative[1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 – 250 mL polyethylene
Total Suspended Solids	None	1 – 250 mL polyethylene
Total Dissolved Solids	None	1 – 250 mL polyethylene
Carbonate, Bicarbonate	None	1 – 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 – 500 mL polyethylene
Radiochemistry (UV / Y12)	HNO_3	1 – 1L polyethylene
VOA	None	2 – 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 – 40 mL amber glass with Teflon lined septum lid

STD:	**ESLIMS LAB TEST ID**		
FLD	GWSPSAMP		
CHEM	ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY		
MET(1)	ICP6010, ICPMSGW and HG7470		
VOC(1)	VOA8260GW		
RAD (1)	Gross Alpha Beta (GROSSAB-ENV)	500 mL	preserved w HNO_3
RAD (3)	^{234}U, ^{235}U, ^{238}U (ASPECU-ENV)	500 mL	preserved w HNO_3

[1] Samples chilled to 4 +/- 2C

STD, RAD (3,13)

Parameter	Chemical Preservative[1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 – 250 mL polyethylene
Total Suspended Solids	None	1 – 250 mL polyethylene
Total Dissolved Solids	None	1 – 250 mL polyethylene
Carbonate, Bicarbonate	None	1 – 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 – 500 mL polyethylene
Radiochemistry (UV / Y12)	HNO_3	1 – 1L polyethylene
TIMS	HNO_3	1 – 250 mL polyethylene
VOA	None	2 – 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 – 40 mL amber glass with Teflon lined septum lid

STD: **ESLIMS LAB TEST ID**
FLD GWSPSAMP
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY
MET(1)ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW

RAD (1)	Gross Alpha Beta (GROSSAB-ENV)	500 mL	preserved w HNO_3
RAD (3)	^{234}U, ^{235}U, ^{238}U (ASPECU-ENV)	500 mL	preserved w HNO_3
RAD(13)	wt% ^{235}U and ug/g Total U (TOTAL-U-ENV)	250 mL	preserved w HNO_3

[1] Samples chilled to 4 +/- 2C

STD, RAD (12)

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, turbidity, and Fluoride	None	1 – 250 mL polyethylene
Total Suspended Solids	None	1 – 250 mL polyethylene
Total Dissolved Solids	None	1 – 250 mL polyethylene
Carbonate, Bicarbonate	None	1 – 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 – 500 mL polyethylene
Radiochemistry (UV / Y12)	HNO_3	1 – liter polyethylene &
VOA	None	2 – 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 – 40 mL amber glass with Teflon lined septum lid

STD: **ESLIMS LAB TEST ID**

FLD GWTRSAMP

CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY

MET(1)ICP6010, ICPMSGW and HG7470

VOC(1) VOA8260GW

RAD (1)	Gross Alpha Beta (GROSSAB-ENV)	500 mL	preserved w HNO_3
RAD (12)	Tc-99 (TC99LS-ENV)	500 mL	preserved w HNO_3

[1] Samples chilled to 4 +/- 2C

STD, RAD (12,13)

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, turbidity, and Fluoride	None	1 – 250 mL polyethylene
Total Suspended Solids	None	1 – 250 mL polyethylene
Total Dissolved Solids	None	1 – 250 mL polyethylene
Carbonate, Bicarbonate	None	1 – 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 – 500 mL polyethylene
Radiochemistry (UV / Y12)	HNO_3	1 – liter polyethylene &
TIMS	HNO_3	1 – 250 mL polyethylene
VOA	None	2 – 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 – 40 mL amber glass with Teflon lined septum lid

STD: **ESLIMS LAB TEST ID**
FLD GWTRSAMP
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY
MET(1)ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW

RAD (1)	Gross Alpha Beta (GROSSAB-ENV)	500 mL	preserved w HNO_3
RAD (12)	Tc-99 (TC99LS-ENV)	500 mL	preserved w HNO_3
RAD(13)	wt% ^{235}U and ug/g Total U (TOTAL-U-ENV)	250 mL	preserved w HNO_3

[1] Samples chilled to 4 +/- 2C

STD, RAD (3, 12, 13)

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 – 250 mL polyethylene
Total Suspended Solids	None	1 – 250 mL polyethylene
Total Dissolved Solids	None	1 – 250 mL polyethylene
Carbonate, Bicarbonate	None	1 – 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 – 500 mL polyethylene
Radiochemistry (UV / Y12)	HNO_3	1 – liter polyethylene & 1 – 500 mL polyethylene
TIMS	HNO_3	1 – 250-mL polyethylene
VOA	None	2 – 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 – 40 mL amber glass with Teflon lined septum lid

STD: **ESLIMS LAB TEST ID**
FLD GWTRSAMP
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY
MET(1)ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW

RAD (1)	Gross Alpha Beta (GROSSAB-ENV)	500 mL	preserved w HNO_3
RAD (3)	^{234}U, ^{235}U, ^{238}U (ASPECU-ENV)	500 mL	preserved w HNO_3
RAD (12)	Tc-99 (TC99LS-ENV)	500 mL	preserved w HNO_3
RAD(13)	wt% ^{235}U and ug/g Total U (TOTAL-U-ENV)	250 mL	preserved w HNO_3

[1] Samples chilled to 4 +/- 2C

WESTBAY

Parameter	Chemical Preservative [1]	Bottle Types/Size
Anions, Turbidity, and Fluoride	None	1 - 250 mL polyethylene
Total Suspended Solids	None	1 - 250 mL polyethylene
Total Dissolved Solids	None	1 - 250 mL polyethylene
Carbonate, Bicarbonate	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	HNO_3	1 - 250 mL polyethylene
Radiochemistry (UV / Y-12)	HNO_3	1 – 250 mL polyethylene
VOA	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	None	1 - 40 mL amber glass with Teflon lined septum lid

STD: **ESLIMS LAB TEST ID**

FLD GWTRSAMP
CHEM ALKALINITY-I, ANIONS, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D, TURBIDITY
MET(1)ICP6010, ICPMSGW and HG7470
VOC(1) VOA8260GW
RAD(1)GROSSAB-ENV

[1] Samples chilled to 4 +/- 2C

ESTABLISHED HOLDING TIMES

Parameter	Holding Times
Alkalinity (Carbonate, Bicarbonate)	14 days
Anions (Chloride, Nitrate, Sulfate)	48 hr
Fluoride	28 days
Mercury	28 days
Metals (ICP, ICPMS)	6 months
Radiochemistry (except tritium)	6 months
Solids, Total Dissolved	7 days
Solids, Total Suspended	7 days
Tritium	No EPA guidance
Uranium by Thermal Ionization Mass Spec	6 months
VOA	7 days

ESTABLISHED TURNAROUND TIMES

The Groundwater Protection Program and the Analytical Chemistry Organization (ACO) laboratory have agreed upon a turnaround time, such that the analytical data generated from all sample locations within a sample group will be transmitted to the Data Manager as a data deliverable. Currently, the turnaround time for all sample groups is 35 days from the receipt of the last sample within a group. Data is transmitted in the form of hard copy of the completed and approved lab reports for each locations, along with an electronic copy in a standardized and compatible format (please see *Y-12 Plant Groundwater Protection Program Data Management Plan, Revision 2*, November 2003, Y/SUB/03-013288/1).

ELEVATED MINIMUM DETECTABLE ACTIVITY

Groundwater samples with high TDS (>1,000 mg/L) typically have elevated minimum detectable activities (MDAs) for gross alpha (> 15 pCi/L) and gross beta (> 50 pCi/L). However, the MDAs for specific isotopic analyses are unaffected by the sample solid content. For samples with gross activity results that are less than an elevated MDA, and specific isotopic analyses have not been requested, the laboratory will issue a request to analyze for the principal alpha- or beta-emitting isotopes. That is, if the gross alpha MDA exceeds 15 pCi/L and the result is less than 15 pCi/L, then the laboratory will request analyses of isotopic uranium (by method Y/P65-7061). Similarly, if a sample has an elevated gross beta MDA (>50 pCi/L) and the result is less than the MDA, then the laboratory would request analysis of technetium-99 activity. These requests will be approved by the Y-12 Groundwater Protection Program manager, or designee, before analyses are performed.

APPENDIX E

ADDENDA TO THE CY 2005 SAMPLING AND ANALYSIS PLAN
(if issued)

APPENDIX F

CY 2004 GROUNDWATER MONITORING SCHEDULES

DISTRIBUTION

U.S. DEPARTMENT OF ENERGY

J.P. Donnelly

ENVIRONMENTAL COMPLIANCE DEPARTMENT

J.M. Eaton
S.M. Field
S.B. Jones
K.G. Hanzelka
C.C. Hill
E.R. Schultz
L.O. Vaughan
GWPP-File (2)
EC Document Center

ANALYTICAL CHEMISTRY ORGANIZATION

D.D. Altom
L.E. White (2)

TECHNICAL COMPUTING

S.W. King

YDCC - RC
Y-12 Central Files
Y-12 Records Services (Electronic copy-OSTI)

ELVADO ENVIRONMENTAL LLC

T.R. Harrison
J.R. Walker

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

J.L. Vance
W.K. Jago
D.L. Smith

BECHTEL JACOBS COMPANY LLC

E.L. Berglund
J.I. Cox
H.L. King
L.M. Sims (2)
File-EMEF-DMC

COMMODORE ADVANCED SCIENCES, INC.

W. Foutz

UT-BATTELLE, LLC

D.B. Watson

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION DOE OVERSIGHT

D. Gilmore (3)